

**I. *The Description and Manner of using an Instrument for measuring the Degrees of the Expansion of Metals by Heat.***  
*By Mr. John Ellicott.*

*See the Fig. prefix'd.*

AA is a flat Plate of Brass, which, for farther Strength, is screwed down to a thick Piece of Mahogany: Upon this Plate are screwed three Pieces of Brass, two of which, marked BB, serve as Supports for the flat Iron Bar C; and which, on account of its Use, I shall call the *Standard Bar*. The upper Part of the third Piece of Brass is a Circle about three Inches Diameter, divided into 360 equal Parts or Degrees: Within this Circle is a moveable Plate, divided likewise into 360 Parts, and a small Steel Index. The Brass Circle in the *Fig.* is marked D, and the moveable Plate *d*. Upon the Standard Bar the Bar of Metal is laid, on which the Experiment is to be made, as E.

F is a Lever  $2\frac{1}{2}$  Inches in length, fastened to an Axis, which turns in two Pieces of Brass screw'd to one of the Supports marked B: To the End of this Lever is fastened a Chain, or Silk Line, which, after being wound round a small Cylinder, to which the Index in the Brass Circle D is fastened, passes over a Pulley, and has a Weight hung to the End of it: Upon the Axis, to which the Lever is fixed, is a Pulley,  $\frac{1}{4}$  of an Inch Diameter, to which a Piece of Watch-chain is fastened; the other End of this Chain is hook'd to a strong Spring, marked G, which Spring bears against one End of the Metal E.

H is a Leaver exactly of the same Form and Dimensions with the former; but the Chain fastened to the Pulley on its Axis is hook'd to the Standard Bar\*. The Line fasten'd to the End of this Leaver, after being wound round a Cylinder, to which the moveable Plate is fixed, passes over a small Pulley, and has a Weight hung to the End of it; or rather the same Line passing under a Pulley, to which the Weight is hung, has its other End fastened to the Leaver F: Thus one Weight serves for both-Leavers, as in the *Figure*.

From this Description it is plain, that whenever the Bar E is lengthen'd, it gives Liberty to the Weight to draw the Leaver F upwards by its Action on the Spring G; and the Index will, at the same time, by Means of the Silk Line, be carried forward in the Circle; and as the Bar shortens, it will return back again; the same Motion will be communicated to the Standard Bar.

The Lengthening the Bar the  $\frac{1}{8}$  of an Inch, will carry the Index once round the Brass Circle, which is divided into 360 Degrees; therefore, if the Metal lengthens the  $\frac{1}{7200}$  Part of an Inch, the Index will move one Degree.

To make an Experiment with this *Instrument*, lay a Bar of any kind of Metal, as E, on the Standard Bar; then heat the Standard Bar to any Degree of Heat with a Lamp, and mark the Degree of its Expansion as marked by the moveable Plate: Observe also the Degree of Expansion of the Metal E, by the Heat

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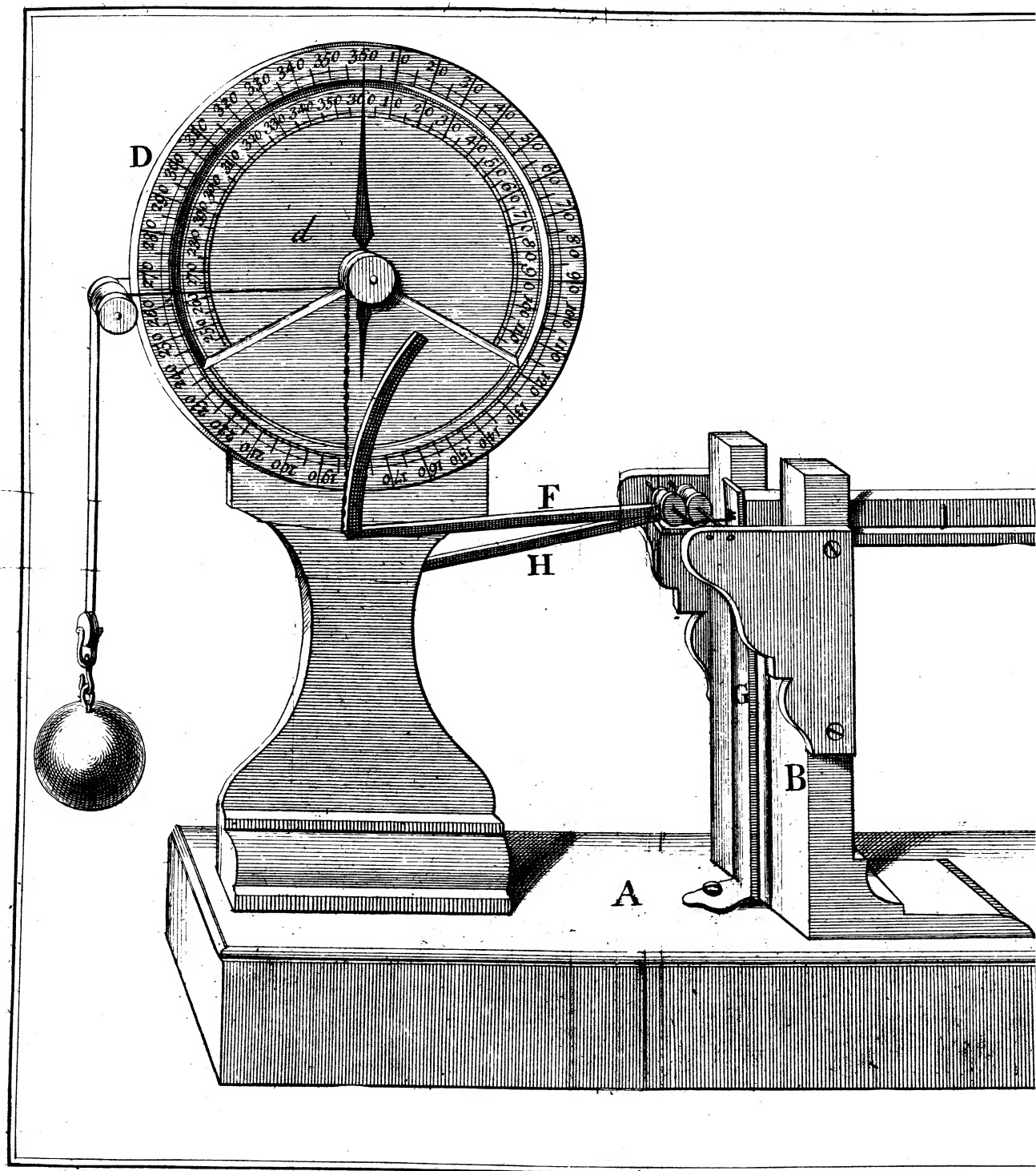
\* N. B. The Chain to the former Pulley being fasten'd to a Spring, and not directly to the Metal E, is only for the more easy shifting the Metals.

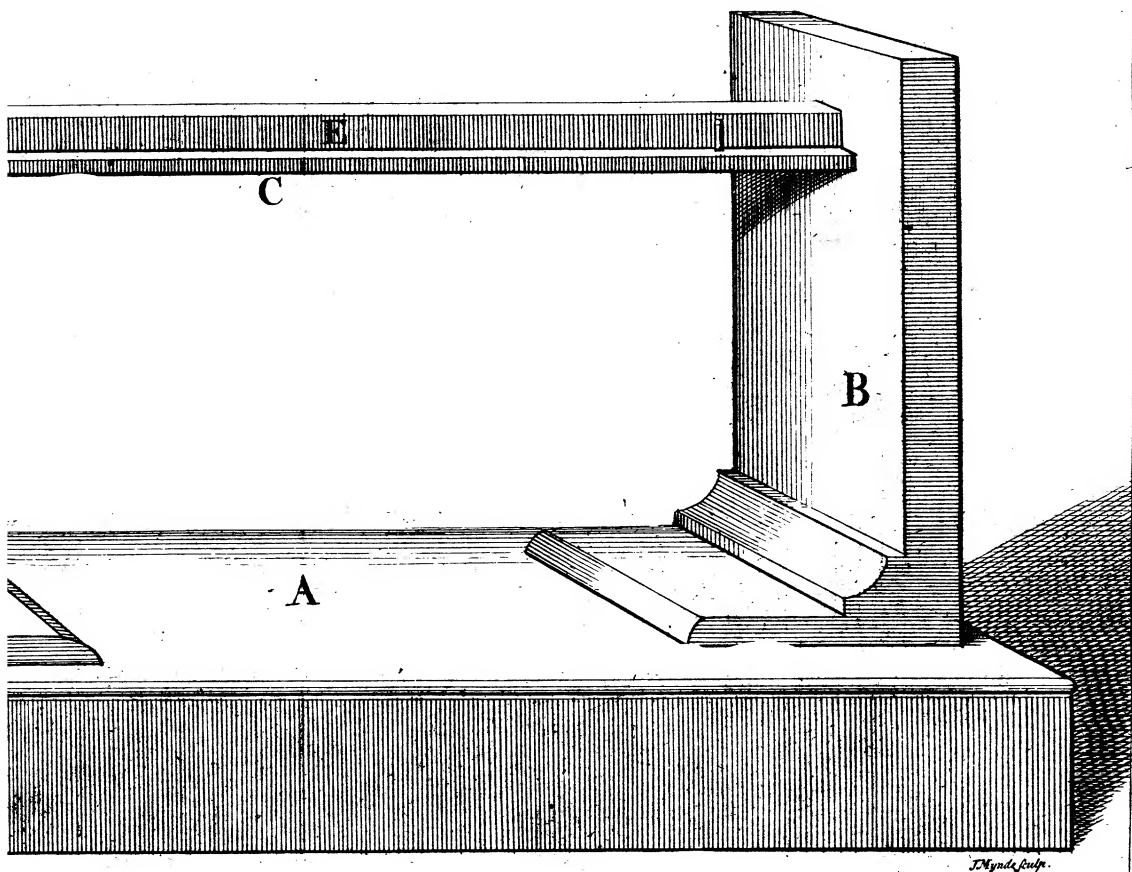
communicated to it from the Standard Bar, as mark'd on the Brass Circle by the Index: Let the *Instrument* stand, till the whole is thoroughly cold; then removing the Bar E, lay a Bar of any other Metal in its Place, and heat the Standard Bar to the same Degree of Heat as before, which is seen by the moveable Plates marking the same Degree of Expansion. Then the Index will shew the Degree of Expansion of the second Metal, as it did of the first; and, by this Means, the Degrees of Expansion of different Metals by the same Degree of Heat, may be exactly estimated.

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## II. *A further Account of the Bones of Animals being made Red by Aliment only.* By John Belchier, F. R. S.

**I**N the former Account, which I gave concerning the *Red Bones* of the *Hogs*, (see N<sup>o</sup> 442. p. 286.) I mention'd, That the Colour was occasion'd by Bran, (being mix'd with their common Food) after it had been made Use of to clean printed Callicoes; the Colours of which were made, some from Preparations of *Iron*, which were the Blacks and Purples; others from Preparations of *Alum*, and *Sacc. Saturni*, which produces the Red Colours; and that *Madder* Root was made Use of to fix these Colours on the Cloth.——To which of these Preparations the Colour was owing, I could not determine. Some were of Opinion, that it was intirely occasion'd by the Preparations of *Iron*; others, that it was the whole blended together: And, in or-





*J. Wynde sculp.*

